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CARBURETOR IDLE AIR BYPASS ARRANGEMENT

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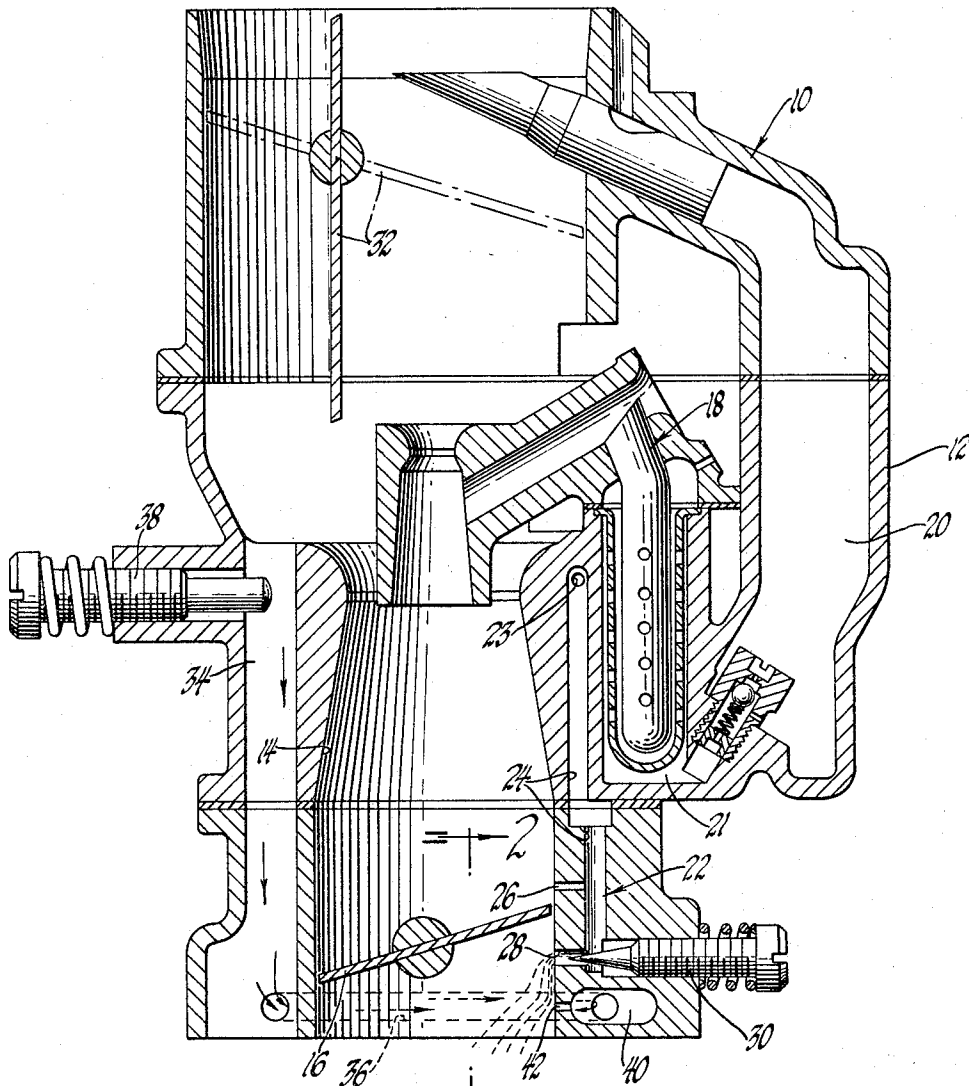


Fig. 1

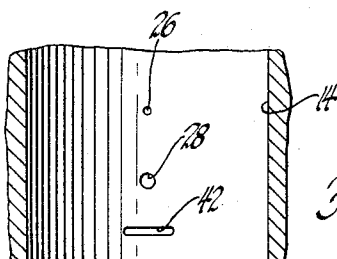


Fig. 2

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**CARBURETOR IDLE AIR BYPASS
ARRANGEMENT**

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ration of Delaware
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1 Claim. (Cl. 261—41)

This invention relates to carburetors for internal combustion engines and more particularly to a carburetor idle air bypass arrangement.

Most currently used carburetors include an idle fuel opening in the induction passage wall downstream of the throttle plate to supply the engine with fuel under idle or light load operating conditions when the throttle plate is closed. Since there is little air flow through the induction passage when the throttle plate is closed, the fuel has a tendency to run down the induction passage wall and into the intake manifold as a liquid stream rather than as an atomized mixture.

One feature of this invention is that the carburetor provides a uniform air-fuel mixture to the engine under idle or light load operating conditions. Another feature of this invention is that the carburetor includes an air bypass arrangement for bypassing ambient air to an opening in the induction passage wall downstream of the idle fuel opening to provide an air curtain directing the fuel away from the induction passage wall and providing a uniform dispersion of the fuel within the ambient air.

These and other features of this invention will be readily apparent from the following specification and drawing wherein:

FIGURE 1 is a cross-sectional view of a downdraft carburetor embodying an idle air bypass arrangement according to this invention.

FIGURE 2 is a fragmentary view taken generally along the plane indicated by line 2—2 of FIGURE 1.

Referring now to the drawing, a carburetor designated generally 10 is substantially the same as that shown and described in Brunner et al. 2,824,727 and, accordingly, only those details necessary for an understanding of this invention will be described herein. The carburetor 10 includes a body 12 having an air intake or induction passage 14. Rotatably disposed within the induction passage is a throttle plate 16. Main fuel metering means 18 opens to the induction passage upstream of the throttle plate. The fuel bowl 20 supplies fuel to the fuel well 21 which supplies both the main fuel metering means 18 and the secondary or idle fuel system designated generally 22. Passage 23 of this system communicates with the fuel well in a conventional manner and supplies fuel to passage 24 which communicates with the induction passage 14 through idle fuel openings 26 and 28. Under normal engine operating conditions, the throttle plate is open and substantially the entire fuel requirements are supplied by the main fuel metering means 18, although fuel is also supplied through idle fuel openings 26 and 28. Needle valve 30 restricts the flow of fuel through opening 28 and cooperates therewith in providing idle or secondary fuel metering means.

When the engine is idling, throttle plate 16 is closed and the entire fuel requirements of the engine are supplied through opening 28. Under light load conditions, the

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throttle plate opens slightly and fuel enters the induction passage through opening 26 as well as opening 28. Some of the fuel drawn into the induction passage through openings 26 and 28 runs down the induction passage wall and enters the engine in a liquid state resulting in non-uniform combustible mixture and consequently poor fuel economy.

The air bypass arrangement of this invention provides ambient air to the induction passage downstream of the throttle plate to disperse fuel flowing down the induction passage wall. Air enters the induction passage above choke plate 32 which is open after the engine is started. The air is conveyed by passageway 34 to passage 36 which encircles the induction passage 14. The flow of air through passage 34 is restricted by valve 38. Passage 36 terminates in a chamber 40 which supplies air to an aperture or slot 42. As seen in FIGURE 2, the slot is elongated in a direction transverse to the direction of flow through the induction passage and is substantially wider in this direction than openings 26 and 28. Air drawn from this slot by engine vacuum enters the induction passage as a fan shaped jet of air flowing transverse to the direction of flow through the passage. When liquid fuel running down the induction passage wall from the openings 26 and 28 reaches the fan shaped jet of air it is forced away from the induction passage wall and atomized. Since the slot 42 is wider than the openings 26 and 28 substantially all of the fuel running down the wall intersects the jet of air. This results in a uniform combustible air-fuel mixture to be supplied to the engine.

Thus this invention provides a carburetor idle air bypass arrangement.

I claim:

A carburetor comprising a downdraft induction passage, a throttle valve disposed in said passage, a main fuel supply passage discharging to said induction passage upstream of said throttle valve, an idle fuel supply passage having a fuel discharge port opening to said induction passage downstream of said throttle valve, and an idle air supply passage having an air discharge port opening to the induction passage immediately subjacent said fuel discharge port, said idle air supply passage having an inlet opening from said induction passage upstream of said throttle valve, said air discharge port being horizontally greater in width than said fuel discharge port, said air discharge port having a substantially horizontally disposed elongated configuration to thereby provide a fan-shaped jet of air flowing into said induction passage which will tend to atomize any liquid fuel discharged from said fuel discharge port and provide an evenly dispersed air-fuel mixture in said induction passage.

References Cited by the Examiner

UNITED STATES PATENTS

1,313,584	8/1919	Crusius	-----	123—124
1,456,213	5/1923	Bowles	-----	123—124
2,376,228	5/1945	Brown	-----	261—41
2,518,082	8/1950	Shively	-----	123—124 X
3,174,469	3/1965	Rappolt.		
3,186,692	6/1965	Moseley	-----	261—41

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